DOCUMENT RESUME

ED 265 496 CS 008 255

AUTHOR Clary, Joan; Mahaffy, John
TITLE The Cognitive Domain: The Last Frontier. Final Report of the Regional Study Award Project.
INSTITUTION Northwest Regional Educational Lab., Portland, OR. Center for Professional Development.
SPONS AGENCY National Inst. of Education (ED), Washington, DC.
PUB DATE Nov 85
CONTRACT 400-83-0005
NOTE 14p.
PUB TYPE Viewpoints (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cognitive Development; *Cognitive Processes; *Critical Thinking; Educational Philosophy; *Learning Processes; *Learning Theories; Models; *Reading Programs; *Reading Skills; Teaching Methods

ABSTRACT

The theoretical foundations of thinking skills models differ. One category of thinking skills programs uses the cognitive process approach on the premise that thinking abilities depend upon certain fundamental processes. Thinking skills programs that present a strategic approach to thinking are called heuristics-oriented programs, and focus on an intellectual route to problem solving. The Piagetian approach groups thinking skills in a developmental scheme. In another perspective of thinking skills, it is believed unlikely that one's language competence can be enhanced without a corresponding improvement in one's ability to think and vice versa. In yet another category, thinking with its identified subskills should be taught as a subject in itself. Closely related to the teaching of thinking skills is the "thinking about thinking" model called metacognition. Researchers are suggesting that examining how one thinks will increase and strengthen thinking skills. Published programs and approaches to the teaching of thinking skills include (1) Taxonomy of Educational Objectives, (2) the CORT Thinking Program, and (3) Feurestein Instructional Enrichment. Background, content and materials, and intended audience for each program are described. (HOD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED265496

THE COGNITIVE DOMAIN: THE LAST FRONTIER

Final Report of the Regional Study Award Project

Joan Clary
Associate Professor
Western Montana College
Dillon, Montata

John Mahaffy, Director
Center for Professional Development
Northwest Regional Educational Laboratory
300 S. W. Sixth Avenue
Portland, Oregon

November 1985

CS008255

The work upon which this publication is based was performed pursuant to Contract No. 400-83-0005 of the National Institute of Education. It does not, however, necessarily reflect the views of that agency.

As the past decade has seen a surge of interest in body physical fitness and performance, so too, there has been a concerted interest in brain research and human learning. It has been suggested that more has been learned about the mind in the last decade than had been learned since the beginning of time.

The interest in learning and thinking is particularly evident in the educational community for a plethora of reasons. The rask of commissions on the study of American education reflect a critical attitude on the accountability of schools. A large fraction of high school graduates is entering colleges and universities not adequately prepared to do the thinking college courses will require.

The rise of the information age has thrust us, in education, from being content driven groups to being process driven professionals. Ferguson, p.289 describes:

Assumptions of the Old Paradigm of of Education	Assumptions of the New Paradigm of Education
Emphasis on content acquiring a body of "right" information, once and for all.	Emphasis on learning how to learn, how to ask good questions, pay attention to the right things, be open to and evaluate new concepts, have access to information. What is now "known" may change. Importance of context.
Learning as a product, a destination.	Learning as a process, a journey.
Relatively rigid structure, prescribed curriculum.	Relatively flexible structure. Belief that there are many ways to teach a given subject.

Guessing and divergent thinking discouraged.	Guessing and divergent thinking encouraged as part of the creative process.
Emphasis on analytical linear, left-brain thinking.	Strives for whole-brain education, augments left-brain rationality with holistic, nonlinear, and intuitive strategies. Confluence and fusion of the two processes emphasized.

Reflecting again on the health concerned generation, sometimes referred to as the "Pepsi Generation," there are as many approaches to produce and maintain the body "par excellence" as there are schools of thought.

So too regarding human, intellectual potential, sometimes referred to as the "Last Frontier," there are diverse theories and approaches to the exploration of this vast frontier. It is understandable that with such a wealth of information concerning brain research and learning coupled with the absence of any agreement on the nature of intelligence that educators might suffer from "intellectual indigestion." The response of the educational community to this extensive research has been to select a segment of the research and design a model that incorporates a selected theory from this new knowledge base. The result is a "Babel" communication barrier. The literature abounds with articles: deploring the state of thinking skills in the schools; describing a variety of thinking skills models; presenting success stories, etc. The educator becomes overwhelmed and confused as to the selection and implementation of thinking skills into the curriculum. This confusion is the result of many inconsistencies and is analogous to the teacher's initial reaction to the individualization of instruction thrust of the past. The

theoretical foundations differ from thinking skills model to model. The terminology of each model differs causing ambiguity. The scheme and classification of thinking skills are not consistent. The design of models and intended audiences show great variation. The goals and objectives of models vary in degree and kind. These aspects give testimony to the fact that the teaching of thinking skills in the curriculum is going all ways at once with no clearly defined destination in mind.

The object of this paper is to give some form to the extensive amount of current literature on thinking skills, to provide the reader with an organizer whereby he/she can evaluate literature on thinking skills in a more meaningful context.

Nickerson, et al., after examination of many thinking skill models, have attempted to develop categories which would group similar characteristics of these models. An understanding of the theoretical underpinnings of these thinking skill models should make clear some of the ambiguities in this area for the educator.

Nickerson, et al., call one category of thinking skills programs the cognitive process approach. Programs and/or approaches that fit in this category make assumptions that thinking ability depends upon certain fundamental processes. The processes often identified are comparing, ordering, classifying, inferring and predicting. Proponents of this approach assume that practice with thinking skills tasks will strengthen the underlying processes and make them more readily assessible for application to other context in which they are used. This approach has been considered a more or less "muscles of the mind" approach, where

practice in the areas identified will bring mental agility. A great deal of credence is given to the assumption that transfer will naturally accure into other thinking activities.

Thinking skills programs that present a strategic approach to thinking are called heuristics-oriented programs. These models focus on an intellectual route to problem solving. All information gathering is viewed as a problem to be addressed. The problem-solving heuristic approach is used with science and math programs. Programs that fit this category list as their skills conceptualizing a problem; finding alternative ways of representing the problem; breaking the problem into parts simpler than the original in an effort to be solved. Programs vary in the step-by-step approach to problem solving.

The Piagetian approach groups those thinking skills models that approach thinking in a developmental scheme. The skills cited in these types of thinking skills programs suggest activities focusing first on concrete operations and then moving to more formal or abstract operations. Students are encouraged to generalize their concrete experiences and then to discover from these, principles relevant that extend beyond the situation explored. These programs focus on facilitating the movement of students from one Piagetian stage of development to a higher cognitive level.

Another perspective of teaching thinking skills is by those that espouse that suggestion that it is unlikely that one's language competence can be enhanced without a corresponding improvement in one's ability to think and vice versa. Thus, the language arts are considered not only a medium of thought but also a vehicle for the developing of

thought. A major advantage of using language, writing in particular, is that it yields a tangible product that can be evaluated.

A group of researchers believe that thinking with its identified sub-skills should be taught as a subject in itself. The assumptions behind this approach are that a person's awarenesses of strengths and weaknesses will prompt the individual to exploit his/her strengths and compensate the weakness and avoid the egregarious common errors. Programs using this approach focus on the mental operations employed, while the content used is of secondary importance.

Closely related to the teaching of thinking skills is the "thinking about thinking" called meacognition. Researchers are suggesting that examining how one thinks will increase and strengthen thinking skills.

The following is a synthesis of several published programs and approaches to the teaching of thinking skills. The models described are not an exhaustive list but merely a representative sample of materials availalble.

One of the very first attempts at raising the ordinary classroom discourse to employ higher level thinking skills originated in 1948. Although most education undergraduates and classroom teachers are familiar with the term Bloom's Taxonomy, most teachers do not have a clear and concise concept as to the origin and purpose of the taxonomy. It is unclear whether the original group of educators understood the broad ramifications and extent of the finished product as well. As willbe illustrated in the material that follows, the taxonomy had a two-fold purpose: 1) to design a framework that would facilitate communication among educators and 2) to help test constructors identify

specific objectives. Although the taxonomy was one of the first, if not the first, to identify and list a variety of intellectual interactions with information, it has been stymied in its effect upon instruction. The prevalent approach to the use of the taxonomy is to use the hierarchy of cognitive levels in questioning strategies. Most educators are not aware of the limitless possiblities of "intellectual interactions" at each of the cognitive levels identified. Since the questioning strategies appear to be the only approach to the implementation of Bloom, many teachers do not employ the Bloom model. The following is a brief overview of the origin, design and purpose.

Taxonomy of Educational Objectives

Background

A group of college educators, people involved in college test construction met to discuss the need for an instrument to standardize testing communication among these college examiners. Since educational objectives provide the basis for a curriculum, it was decided to develop a framework of hierarchial cognitive skills. The test constructional personnel could then match test items to the cognitive levels of the framework.

This group continued to work and refine this hierarchical framework of cognitive skills until it was formally published in 1951, entitled Taxonomy of Educational Objectives. Benjamin S. Bloom's name is often identified with the Taxonomy since he was the major editor (his name was listed first followed by the names of the rest of the committee). The Taxonomy of Educational Objectives is not built upon any specific

curriculum but is a continuum of cognitive skills from the simplest to the more complex.

Content and Materials

The original document was a published handbook describing the history of the project. The main portion of the book focuses on the cognitive skills continuum with an explanation of the skills in operation. Also, each cognitive level is followed by sample test items testing the thinking activity for that section.

The category titled "Knowledge" requires the student to remember previously learned materials. The student is free to report the learned material in a variety of ways.

The category titled "Comprehension" requires the student not only to recall the material but to indicate an understanding of the remembered material.

The category "Application" requires the student to use learned material in new situations.

The category "Analysis" requires the student to break down materials while the category "Synthesis" requires the student to put learned material together in a new form.

The category "Evaluation" requires the student to assess the value of the learned material for a given purpose.

The intent of the taxonomy was to provide a means of insuring accuracy of communication. The project was not undertaken to isolate or to generate something new but it was geared to develop an accepted taxonomy as a vehicle to insure accuracy of communication. A commonly accepted classification of goals and terms would allow teachers,

administrators and specialists to discuss educational objectives with greater precision. The material of the handbook makes no attempt to present the taxonomy as a definitive statement about cognitive skills. It was merely an early attempt to identify and classify a cognitive, hierarchical classification system.

Intended Audience

As is understandable, the original intended audience was college students, as the original group was college personnel interested in test construction. As the taxonomy became more widely accepted, it was incorporated by curriculum developers and suggested for use throughout the school system. Appendix A-1 contains a general outline of the original taxonomy, A-2 lists an adaptation of the taxonomy. Available Source: Taxonomy of Educational Objectives. Benjamin S. Bloom, ed. David McKay Company, Inc., New York.

Another program currently referred to in literature is from England (this program is not widely used in the United States). The following is a brief description.

The CORT Thinking Program

Background: Dr. Edward deBono studied and practiced the teaching of thinking with students of all ages, as well as business executives for over 17 years. A Rhodes Scholar, he held faculty appointments at Oxford and Harvard and is the founder and director of the Cognitive Research Trust in Cambridge, England. The CORT Thinking Program is an acronym for Cognitive Research Trust.

Content and Materials

The CORT Program consists of six units, with each unit covering one broad area of thinking. There are ten lessons in each unit and a student workcard. A teacher's handbook presents the developmental concept behind each thinking skill; specific teaching techniques; suggested applications within the classroom; and test and evaluation items. The Title of the CORT units are: I—Breath; II—Organization; III—Interaction; IV--Creativity; V--Information and Feeling; and VI—Action. The descriptive brochure lists the areas of concentration as the ability to expand perception; solve problems; organize information; ask questions; and apply thinking to decision-making and action.

Intended Audience

Dr. deBono suggests that the program can be used with students eight years old and above. His brochure lists corporations that have also used the program.

Appendix B contains pages from a brochure describing the program content. Available Source: Pergamon Press, Fairview Park, Elmsford, NY 10523.

A program dealing with the development of thinking skills was also designed outside the U.S. by Reuven Feuerstein. A description follows.

Feurestein Instructional Enrichment

Background

Reuven Feuerstein, an Israeli psychologist, while pursuing a graduate degree, began to work with the Youth Abyak, the agency responsible for the collection and integration of Jewish children into Israel. Tests

were given for the planning of the students' education but these tests proved inadequate because they reflected what students had learned in the past but did not indicate what students could learn. Feuerstein noted that clinical observation strongly suggested that a substantial reservoir of abilities were being left untapped by the measuring instruments then being used. On the basis of 25 years experience and research, Feuerstein has developed a formal instructional program called "The Feuerstein Instructional Enrichment Program" (FIE Program). Feuerstein's assessmentof learning potential breaks with a half-century of theory and technology in the measurement of intelligence. He is not interested in the content of the mind, the informational base, but he is interested in the formal thought patterns and structures. Feuerstein assumes that 1) intelligence is dynamic, not static; 2) cognitive development requires direct intervention over time to build the mental processes for learning to learn. Cognitive development requires mediated learning experience.

Content and Materials

The program is a compilation of paper and pencil exercises. Students do suggested activities followed by discussion in an attempt to develop insight to bring about the transfer of learning to other subjects. The teacher is the facilitator of the activity. A student's errors are viewed as a source of insight into how he/she solves problems. Emphasis is on process rather than product. A sample of the skills focused on by the activities are: classification/comparison, orientation in space, following directions, planning, organizing logical reasoning, inductive and deductive reasoning and synthesizing.

Intended Audience

The initial intent of the program was for use with what he labelled retarded performance, not retarded students as such. Later it was recognized that students from upper elementary to secondary levels would benefit from the program. Available Source: Curriculum Development Associates, Inc., Suite 414, 1211 Connecticut Avenue, N.W., Washington, DC 20036.